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ABSTRACT

With the advent of microcomputers into the public school classroom, there is a growing need for teachers to be knowledgeable about computer application and potential. The Teacher Education Program at James Madison University has attempted to meet this need by developing a self-instructional module on computer literacy for its introductory education course. The module deals with the following topics: (1) introduction to the computer; (2) computer assisted instruction; (3) basic programming skills; (4) word processing; and (5) evaluation of software. Each topic identified several objectives, activities, and an evaluation check. The purpose of this paper is to describe this initiative to integrate a computer literacy component into a teacher education course by reviewing the content and implementation of the Computer Literacy Module. (Author)

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PANDORA'S CHIP:
COMPUTER LITERACY FOR PRE-SERVICE TEACHERS

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Computers for instructional use in public elementary and secondary schools in 1981 numered about 31,000. In 1984 there were approximately 350,000 computers, an average of four per school. The National Center for Education Statistics reports the number of computers in the schools is expected to double in each of the next five years.(Bonner, p. 64) Some forecasters are claiming that by the twenty-first century computers will be available to students in prospersous school districts on a 1:4 ratio.(Cetron, Soriano, and Gayle, p. 19)

The pervasiveness and popularity of computers have prompted some to be rather skeptical about the grandiose claims made of the computers' educational value by the "hardware romantics." They criticize the proliferation of computers in the schools as faddish, especially when this preoccupation with hardware and software distracts us from dealing with some basic educational problems.(See "The Information Society: Byting the Hand that Feeds You," by Harriet T. Bernstein, in Phi Delta Kappan, October 1983, pp. 108-109)

Despite the critics, electronic technology has some very important implications for our schools. When William T. Harris, U.S. commissioner of Education from 1889 to 1906, referred to the basic subjects of grammar, arithmetic, geography, and history as "the windows of the soul," little

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did he realize that one day technology would be included in that pane of glass. The report, A Nation at Risk: The Imperative for Educational Reform, recommends a half year course in computer science (p. 24) and High School, the study by the Carnegie Foundation for the Advancement of Teaching, calls for the teaching of technology literacy. (p. 111)

What implications do the above recommendations and increased numbers of computers in the schools have for teacher education programs? How can college/university courses directed toward pre-service teachers respond to the growing need to incorporate computer literacy? The purpose of this paper is to answer these questions by describing an initiative to integrate a computer literacy component into a teacher education course.

I

During the 1982-83 academic year an ad hoc committee in the College of Education and Human Services was established to study computers and pre-service teacher education at James Madison University. The committee's objectives were to determine the computer competencies appropriate for beginning teachers, recommend ways these competencies could be developed, and identify resources necessary for pre-service teachers to develop these computer competencies. Supporting the assumption that public schools would continue

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expanding computer use, the committee members contended that teachers who are knowledgeable about computer application and potential are needed. The final report of the committee cited several studies which highlighted a significant lack of knowledge about and interaction with computers by pre- and in-service teachers. One 1980 study which surveyed 227 student teachers, reported that 94 percent of the respondents felt inadequately trained in computer literacy. In another case, 86 percent of the teachers contacted by researchers were interested in computers but only 39 percent interacted with computers.(p. 2)

The neglect of teacher education programs to implement effective computer education has been consistently recognized in the literature.(Bonner, 1984 and Bork, 1984) Some efforts are being made to familiarize teachers with computers. California, Virginia, and Minnesota have established teacher training programs designed for this purpose, and colleges of education are beginning to take the initiative. In Virginia alone there was a fifteen fold increase in the number of computers in the public schools during the two year period from 1980 to 1982 and all teachers who responded to a recent survey believed that "...computer literacy in some fashion should be a part of the curriculum for at least some of the students."(Final Report of the Ad Hoc Committee, p. 4) The gap between the curricular demands in computer education for public school

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students and the current status of teachers' knowledge in this area is a wide one.

To help alleviate this problem, the ad hoc committee recommended all undergraduate students in teacher education achieve competency in computer literacy. The competencies delineated were understanding the role of computers in education, becoming familiar with the terminology and mechanical operation of computers, selecting and using software, and developing programming skills. To help students achieve the above competencies and others, a Computer Literacy Module was developed. The content and implementation of this module is described in the following section.

II

Under the auspices of a grant from James Madison University, a Computer Literacy Module was developed during the Summer of 1985. This module was used in one section of EDUC 360, Introduction to American Education, during the Fall semester, 1985. EDUC 360 is an undergraduate education course and generally the first professional education course pre-service teachers enroll in during their sophomore or junior years. The course serves students from all majors and is required for certification in the state of Virginia.

The module contained five parts: 1.) Introduction to the Computer; 2.) Computer Assisted Instruction; 3.) Basic

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Programming Skills; 4.) Word Processing; and 5.) Evaluation of Software. Each part identified several behavioral objectives, activities, and an evaluation check.

The objectives gave the students specific performances which were to be mastered as a result of the learning experience connected with the activities. The activities in each part of the module required the students to view videotapes, read articles, and work on the computer. Throughout the entire module seven one-half hour videotapes were assigned for viewing. These tapes were part of a series of sixteen programs for in-service teacher education in computer literacy produced by the Virginia Department of Education. The programs were initially broadcast during the Fall of 1984 and repeated the following year. Relevant programs for use in the module were selected and recorded for a minimal dubbing fee by the Department of Education. Appropriate journal articles were identified and assigned for the purpose of enhancing the students' knowledge of some of the important issues in computer education. The activities included running a variety of software items, completing tutorials in basic programming skills and word processing, and evaluating software. Multiple copies of the tapes, articles, and software were made available in the Educational Media Laboratory of the university. Located in this facility is a collection instructional materials, both print and non-print, and laboratories for audio-visual

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equipment, micro-teaching, and computers. The evaluation checks of the module varied depending on the part. Different parts required the student to complete matching and fill in the blank items, to answer essay and multiple choice questions, or to make corrections in a sample text. The students could check their responses to the objective items by referring to an answer sheet located in the module.

Prior to the distribution of the module, students were requested to purchase their own floppy disks, which were then initialized by the instructor. A short orientation to the computer was held during class on the day the module was given to the students. They were instructed how to turn the computer on, how to insert their disks into the disk drive, and how to reserve equipment and pick up the necessary materials in the Educational Media Laboratory. When the module was distributed, students were informed that it was to be self-instructional and therefore their responsibility to complete. Of course, the instructor would be available if any problems arose, but no periodic evaluations were given. The only requirement was the completion of a computer literacy exam which was administered toward the end of the semester.

III

At the beginning of the semester in which the module was utilized, a pre-assessment was given to the students to

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determine their experience in using computers, their knowledge of fundamental terminology, programming, and word processing and their attitudes toward computers.

Twenty-three students were enrolled in this section of EDUC 360. Of this number, nine students had never used a computer before. There was an even mix in these students between those who were looking forward to working on computers and those who expressed some reluctance toward the experience. Those fourteen students who had used computers previously had experiences such as taking BASIC, FORTRAN, and COBOL programming courses, handling data in a chemistry laboratory, using computers in job related work, completing logic exercises in a philosophy class, using the computer in a required general studies mathematics course, and taking a word processing class. Only two students of the twenty-three owned a personal computer, and twelve had taken at least one computer course while eleven had no such background.

The pre-assessment included ten matching items concerning computer terminology. Students scored an average of 6.9 points out of 10 on this section, with scores ranging from a low of 3 to a perfect 10. The same items were repeated in the computer literacy exam given at the end of the semester. At this time students scored an average of 9.8 with five students scoring 9 points and eighteen making no errors. It is interesting to note that students who had

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no formal background with computers and/or didn't own a computer did well on the matching items. It would seem that since computer related vocabulary is becoming more common in everyday language usage, one becomes familiar with the terminology even without direct experiences. There seemed to be no correlation between high scores on the matching items and correct responses to the fill in the blank items dealing with programming(6 items) and word processing(4 items). Most students did poorly in these latter sections. Very few students attempted to answer the final two items on the pre-assessment, and if they did try, their responses were obvious guesses. These items dealt with identifying the three major instructional strategies used in software and in evaluating software. These two areas, instructional strategies and evaluating software, were the ones in which students exhibited the greatest deficiency. It is also in these two areas that many issues are being debated concerning the amount, quality, and design of software, the appropriate instructional use and value of software in the classroom, and the process of evaluating software.(Bork, 1984 and Boyer, 1984)

Students were requested to complete an evaluation of the computer literacy module in which they gave the number of hours involved in doing the module, rated the various parts of the module, and made general comments. The responses to the question of how long it took to complete

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the entire module ranged from a low of 1 to 3 hours to a high of more than 12 hours with most students falling within the 7 to 9 hours category. In terms of actual time spent working on the computer, the responses were evenly distributed between the two categories of 1 to 3 hours and 4 to 6 hours. Overall the comments were favorable concerning the module with suggestions for increasing the time spent working on computers and eliminating the viewing of some of the videotapes.

The module was reviewed for logical consistency, organization, accuracy of content, and mechanics of grammar and spelling by four faculty members and one graduate student. While no substantive recommendations were given, suggestions were made for minor revisions.

IV

At the current time plans are being formulated to incorporate the Computer Literacy Module in all sections of EDUC 360 beginning in Fall semester, 1986. Following the suggestions of the reviewers and students, some refinements and corrections were made to the module.

This module is not intended to rectify all the deficiencies of pre-service teachers with regard to computer literacy. A more comprehensive approach is required that includes computer work in other education courses, such as methods classes. Using the Computer Literacy Module is an

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efficient, simple way to incorporate computer education into an already existing course. Its use represents one step toward future teachers becoming more competent in using computers as effective tools for learning.

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